

Monticello Surface Water and Ground Water Findings and Activities



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Background

The Monticello Surface Water and Ground Water Remedial Action Project is an environmental cleanup project the U.S. Department of Energy (DOE) is conducting in Monticello, Utah. The project involves investigating and, if necessary, cleaning up contaminated surface water and ground water at and downstream of the Monticello millsite. It also involves investigating and possibly cleaning up sediments deposited downstream of the millsite along Montezuma Creek. The project is sometimes called "Operable Unit III" or "OU III." Mill tailings that were stockpiled on the millsite during past uranium and vanadium milling operations are the primary source of contamination in surface water, ground water, soil, and sediment within OU III.

Site Characterization Activities

Since November 1992, site characterization activities have been implemented under the OU III Remedial Investigation, which included installation of ground water monitoring wells, routine collection of ground water and surface water samples for laboratory analysis, measurement of ground water levels in monitoring wells, collection of soil and sediment samples for laboratory analysis, ecological surveys and sample collection, and analysis of rock and sediment in the ground water environment. Results of those activities are being used: 1) to determine the types and distribution of contaminants within OU III, 2) to evaluate movement of contaminants in the environment, 3) to develop a model to predict contaminant concentrations in ground water following remediation of the millsite, 4) to evaluate health risks to humans, plants and animals, and 5) to evaluate remediation options for soil and ground water. The remediation options for soil are evaluated in an Alternatives Analysis Report and for surface water and ground water in a Feasibility Study Report.

Remedial Investigation Report

A report has been prepared to document the Remedial Investigation field characterization activities and findings, and is currently under review by Federal and State regulatory agencies. The nature and extent of contamination in ground water, surface water, soil, and sediment is summarized under the following headings, as presented in the Remedial Investigation Report.

Ground Water

Two aquifers are present in the subsurface of OU III: 1) a shallow water-table aquifer that underlies the mill tailings pile comprised of unconsolidated soils and sediments in the Montezuma Creek valley, and 2) an underlying sandstone aquifer within the Burro Canyon Formation. In the western portion of OU III, the two aquifers are separated by layers of shale and sandstone of the Dakota Formation.

Ground water samples collected from wells in the shallow aquifer contain elevated concentrations of dissolved metals, including arsenic, manganese, molybdenum, selenium, and vanadium; and radiologic constituents, including uranium, radium, and lead. Ground water contamination is distributed in the shallow aquifer beginning at the millsite, extending east within the valley of Montezuma Creek. Contaminant concentrations decrease rapidly with distance from the millsite. Uranium has migrated in ground water approximately one mile from the millsite. In general, the extent of migration of the remaining contaminants is much less than observed for uranium. The shallow aquifer is not currently used for any domestic, or commercial purpose.

Analytical results indicate that Burro Canyon ground water is not contaminated. In the vicinity of OU III, the Burro Canyon Aquifer is a source of drinking water for the City of Monticello during periods of drought. This water is currently used for livestock and irrigation purposes.

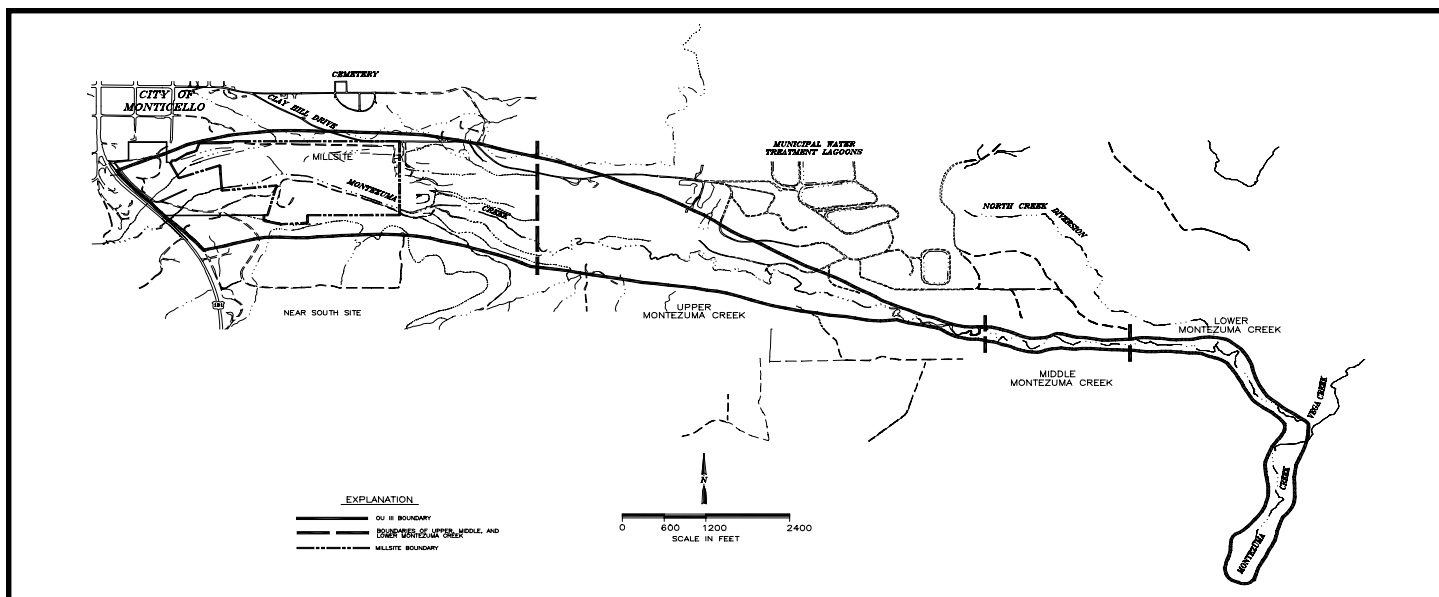


Figure 1. Operable Unit III Study Area

Surface Water

Montezuma Creek, a perennial stream that flows west to east through the millsite, is the main source of surface water in the Monticello area.

Samples collected from small springs on the millsite exhibit the highest concentrations of metals and radionuclides relative to samples obtained from Montezuma Creek. One such spring came from tailings materials and discharged directly to Montezuma Creek. Montezuma Creek sample results indicate that the high concentrations of contaminants discharged from this spring are rapidly diluted. However, downstream of the millsite, discharge of shallow aquifer ground water to Montezuma Creek is a source of contamination in the creek. Uranium contamination has been detected throughout the entire reach of Montezuma Creek in OU III. Other contaminants decrease in concentration to low background levels within OU III.

Soil and Sediment

Prior to stabilization of the mill tailings piles on the millsite, tailings periodically entered Montezuma Creek and have since been transported and redeposited along the creek downstream of the millsite. Because transport of sediment in Montezuma Creek is variable in nature, the distribution of soil and sediment contamination is also variable depending on past and present stream flooding periods.

Generally, contamination is present in a narrow band of soil on both sides of Montezuma Creek but locally extends away from the creek following floodplain topography. Evidence based on soil sample analysis and field measurement indicates that approximately 90% of the contamination in OU III is present in the upper 12 inches of soil and approximately 3% is present below 24 inches. Contamination detected below 24 inches occurs in areas such as within stream meanders, floodplain depressions, and beaver ponds. Soil contamination did not extend beyond the OU III boundary.